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# STEP 1

DEPOSIT COPPER INTO PATTERN OF TRENCHES AND VIA OPENINGS PREVIOUSLY FORMED IN SURFACE OF DIELECTRIC LAYER

# STEP 2

PLANARIZE UPPER SURFACE OF RESULTING STRUCTURE TO REMOVE ALL COPPER ON UPPER SURFACE OF DIELECTRIC LAYER, LEAVING COPPER REMAINING ONLY IN TRENCHES AND VIAS

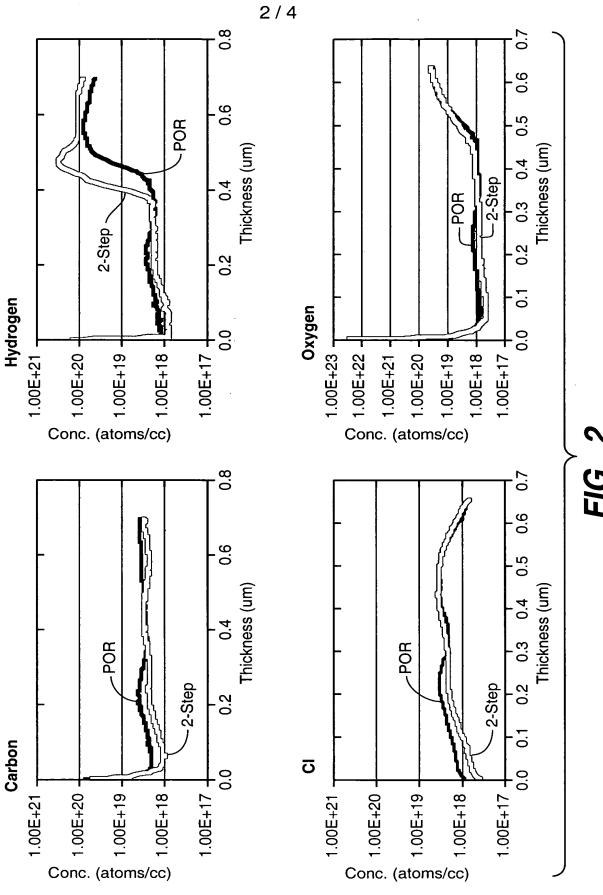
# STEP 3

ANNEAL COPPER REMAINING IN TRENCHES AND VIAS

FIG.\_1
(PRIOR ART)

	ECP Process	MTF	Sigma	T 0.1% at use cond.
Met 2 EM	1-step	119	0.8	240
	2-step	70	0.4	492
Via 1 EM	1-step	52	0.51	51
	2-step	43	0.22	103

FIG.\_4



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# STEP 1

DEPOSIT SUFFICIENT COPPER INTO PATTERN OF TRENCHES AND VIA OPENINGS FORMED IN DIELECTRIC LAYER TO AT LEAST PARTIALLY FILL SAID TRENCHES AND VIA OPENINGS

### STEP 2

ANNEAL DEPOSITED COPPER, INCLUDING COPPER DEPOSITED IN TRENCHES AND VIA OPENINGS

### STEP 3

SURFACE CLEANING OR THIN SURFACE LAYER REMOVAL OF THE DEPOSITED COPPER

#### STEP 4

REPEAT STEPS 1 & 2 AT LEAST ONE MORE TIME

## STEP 5

THEN PLANARIZE UPPER SURFACE OF RESULTING STRUCTURE TO REMOVE ALL COPPER ON UPPER SURFACE OF DIELECTRIC LAYER, LEAVING COPPER REMAINING ONLY IN TRENCHES AND VIAS

## STEP 6

ANNEAL COPPER IN TRENCHES AND VIAS

**FIG.\_3** 

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# FIRST SEQUENCE, STEP 1

DEPOSIT SUFFICIENT COPPER INTO PATTERN OF TRENCHES AND VIA OPENINGS FORMED IN DIELECTRIC LAYER TO AT LEAST PARTIALLY FILL SAID TRENCHES AND VIA OPENINGS

# FIRST SEQUENCE, STEP 2

ANNEAL DEPOSITED COPPER, INCLUDING COPPER DEPOSITED IN TRENCHES AND VIA OPENINGS

## STEP 3

SURFACE CLEANING OR THIN SURFACE LAYER REMOVAL OF THE DEPOSITED COPPER

#### SECOND SEQUENCE

REPEAT STEPS 1, 2, & 3 OF FIRST SEQUENCE TO COMPLETE FILLING OF TRENCHES AND VIAS

THEN PLANARIZE UPPER SURFACE OF STRUCTURE TO REMOVE AT LEAST SOME OF THE COPPER ON THE UPPER SURFACE OF DIELECTRIC LAYER

# THIRD SEQUENCE

DEPOSIT FURTHER COPPER UNDER BULK PLATING CONDITIONS, PLANARIZE TO REMOVE ALL COPPER ON TOP SURFACE, FINAL COPPER ANNEAL

FIG.\_5